Can Lung Ultrasound Be the First-Line Tool for Evaluation of Intraoperative

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Can Lung Ultrasound Be the First-Line Tool for Evaluation of Intraoperative Hypoxemia?

To the Editor

Vertrugo et al[1] propose an interesting approach to intraoperative hypoxemia utilizing transesophageal echocardiography (TEE). We appreciate their insightful letter, which contrasts significantly with our lung ultrasound assessment (LUSA). Although we agree that TEE deserves consideration as a tool for assessment of intraoperative hypoxemia, it does not provide a comprehensive and practical perioperative evaluation.

First and foremost, TEE has inherent limitations for widespread use in the operating room and perioperative period, including invasiveness, requirement of tracheal intubation and muscle paralysis, more advanced training, and much higher complication rates and costs in comparison to point-of-care lung ultrasonography.

The authors describe limitations of LUSA in the intraoperative period due to inaccessibility to the chest. However, this only applies to cardiothoracic surgery. Nevertheless, recent development seeking safer use of surface probes in the surgical field has been used. For instance, a new surgical drape incorporating a probe cover has been developed between our institution and Kimberly-Clark. This drape allows for sterile passage of surface (sector, linear, or even epicardial) probes onto the surgical field. Thus, we can circumvent the issue of sterile field.

Intraoperative TEE can really only visualize the left chest (not the right) and the dependent lung segments of the left hemithorax. Previous publications have shown the shortcomings of TEE-driven lung imaging in the assessment of intraoperative pulmonary edema.[2] In longer surgical procedures, the appearance of some B lines in posterolateral lung regions is expected. Thus, if clinical suspicion of pulmonary edema arises, it is crucial to recognize B lines in all lung regions rather than only in the left base under TEE. Potential perioperative aspiration and appearance of right middle or lower lung segments will not be appropriately assessed with TEE. In addition, other life-threatening intraoperative conditions, such as pneumothorax, while patients receive mechanical ventilation, would be misdiagnosed if TEE is utilized as the primary diagnostic tool, regardless of operator experience. In contrast, LUSA versatility overcomes the aforementioned limitations of transesophageal lung ultrasound (TELU).

The argument that TEE is better than transthoracic echocardiography for diagnosis of intraoperative cardiac issues is just flawed. It is the training, not the probe, that facilitates such diagnosis. Moreover, we can diagnose intrapulmonary shunt, right failure associated with pulmonary embolism, or left ventricular failure via surface echo. In contrast, LUSA entails a comprehensive approach during the entire perioperative period.

We acknowledge that LUSA is critical, independent of echocardiography. Furthermore, application of ultrasound principles is what is important rather than a particular approach, which should be tailored to the clinical scenario (TEE versus transthoracic echocardiography). We do not doubt that TELU offers some specific advantages in certain scenarios (continuous hemodynamic monitoring in a high-risk surgical patient). However, practicality, feasibility, and integration of LUSA to perioperative-focused cardiac ultrasound are unquestionable. Therefore, TEE should not be considered the first-line tool to evaluate perioperative or intraoperative hypoxemia. LUSA and TELU are complementary, where the less invasive approach should be preferred, whenever feasible, and is sufficiently informative.

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